

## REMARKS

### **(1) Cross-Reference to Related Application**

Applicants note that subject matter related to that of the current application is described in Patent Application S/N 10/620,322, filed July 15, 2003, entitled "Detection of Fissile and Radioactive Material in Inspection Contexts and from Mobile Platforms," which is currently the subject of examination in GAU 3663 by Examiner Rick Palabrica.

### **(2) Procedural Note and Request for Withdrawal of Finality**

Claim 1 was amended in Applicants' Response of November 8, 2007, and the Listing of Claims in that response expressly replaced all prior versions and listings of claims. In particular, Applicants removed the limitation to triggering "by other than backscattered radiation" from element "c." of claim 1. As a result of the abovementioned amendment, currently pending claim 1 reads, in relevant part,

1: An inspection system ... comprising:

...

- c. a processor configured as a detector signal discriminator to  
receive the detector signal,  
generate an x-ray image based at least on the illuminating  
penetrating radiation backscattered by the object, and  
generate an output indicating whether the detector signal is  
triggered at least in part by an origin **other than the illuminating  
penetrating radiation.** (emphasis added)

The present Office Action disregards Applicants' amendment of November 8, 2007 and relates back to the claims as they stood *prior* to that Response. Specifically, the present Office Action appears to reflect that Applicants' amendment was not

entered, and that Applicants' remarks were not considered.

More particularly, in reciting grounds for anticipation of claim 1 by Krug, in paragraph "c." of page 3, the Office Action invokes the fact that triggering in the Krug reference is "at least in part by an origin other than the illuminating radiation backscattered by the object," to infer that Krug anticipates the claim, however the claim no longer requires this.

Applicants, therefore, respectfully request withdrawal of this rejection, and of the finality of the present Office Action, and otherwise reserve any failure to enter their amendment of November 8, 2007 for consideration on appeal.

References to the current patent application hereinafter are directed to the text of the specification of the current application published as US 2005/0105665 on May 19, 2005.

### **(3) Summary of Claimed Subject Matter**

Claims 1-13, 22-25, 49-51, and 58 are currently pending in the Application, of which claims 1 and 49 are the only pending independent claims.

The subject patent application is directed to the detection of clandestine nuclear material. As described in the specification and recited in claims 1 and 49, embodiments of the invention use the fact that clandestine nuclear material itself may emit penetrating radiation even when such material is not illuminated by an external source of penetrating radiation (or, equivalently, when a source of illuminating penetrating radiation has a substantially zero intensity). Triggering the detector, configured to detect penetrating radiation during such "dark time" indicates that the triggering radiation originates not from an external source at all, but elsewhere. The resulting signal discrimination serves, therefore, as a basis for (i) distinguishing between illuminating radiation derived from outside the object and emission of radiation due to the clandestine material of the object, and (ii) detecting the clandestine material in question.

Of the pending claims:

- a) claims 1, 3 and 4 stand rejected as anticipated by US 5,600,700 (hereinafter Krug);
- b) claims 49-51 and 58 stand rejected as anticipated by US 6,347,132 (hereinafter Annis2);
- c) claims 1-3, 6-8, 13 and 22-24 stand rejected as unpatentable over US 5,098,640 (hereinafter Gozani) in view of Annis2;
- d) claim 4 stands rejected as unpatentable over Gozani and Annis2 and in further view of US 5,838,759 (hereinafter Armistead);
- e) claim 5 stands rejected as unpatentable over Gozani in view of Annis2, and further in view of US 5,734,166 (hereinafter Czirr);
- f) claims 9-11 and 25 stand rejected as unpatentable over Gozani in view of Annis2, and further in view of US 4,809,312 (hereinafter Annis1);
- g) claim 12 stands rejected as unpatentable over Gozani, Annis2, and Annis1 and in further view of US 6,215,842 (hereinafter Resnick); and
- h) claim 2 stands rejected as unpatentable over Krug and Applicants' Admitted Prior Art (hereinafter AAPA).

#### **(4) Information Disclosure Statement**

Applicants acknowledge that the following references have not been considered:

- references AZ, BC, and BD, disclosed in Applicants' IDS of February 9, 2004, and again, in Applicants' Supplemental IDS mailed November 8, 2007; and
- reference BE, disclosed February 9, 2004.

**(5) Claims 1 through 4 are improperly rejected under 35 U.S.C. 102(b) or 35 U.S.C 103 over Krug, alone or in combination with other prior art.**

The Final Office Action grounds rejection of claim 1 over Krug on the assertion that discrimination of whether “the detector signal is triggered at least in part by the origin other than the illuminating penetrating radiation backscattered by the object” is possible in Krug “through a/o recognition routines also taking into account transmitted radiation (through transmission detector 60 (col. 4, l. 67), transmission signals being taken into account: see col. 9, l. 9-67, col. 11, l. 34-41, and col. 14, l. 50 - col. 15, l. 23).” Final Office Action, at 3.

*A. Claim 1 does not contain the limitation used as a basis for rejection.*

Claim 1 was amended in the previously filed Response of November 8, 2007, and does not contain the limitation referred to in this Final Office Action. In relevant part, claim 1 reads:

a processor configured as a detector signal discriminator to  
receive the detector signal,  
generate an x-ray image based at least on the  
illuminating penetrating radiation backscattered by the object,  
and  
generate an output indicating whether the detector signal  
is triggered at least in part by an origin other than the  
illuminating penetrating radiation.

Therefore, the 102-rejection is not applicable to claim 1.

*B. Claim 1 is patentably distinguishable from the Krug reference because Krug, alone or in combination with other cited prior art, lacks a limitation of claim 1.*

“ANTICIPATION UNDER 35 U.S.C. §102 REQUIRES THAT A SINGLE PRIOR ART REFERENCE DISCLOSE EACH AND EVERY LIMITATION OF THE CLAIMED INVENTION.”

*Moba, B.V. v. Diamond Automation, Inc.*, 35 F.3d 1306, 1321-22, 66 U.S.P.Q.2d 1429, 1439 (Fed. Cir. 2003).

Claim 1 requires, in relevant part, that the processor of the inspection system indicate triggering the detector by radiation having origin that does not derive from the illuminating beam.

The Krug reference describes an X-ray inspection system detecting X-ray radiation that is generated by an X-ray source system 40 and either transmitted through the object being inspected or scattered by different surfaces of such object. The detection of either transmitted or scattered illuminating radiation from the source 40 is detected, for example, by a transmission detector 60 or a back-scatter detector 80. See Abstract, Figs. 1 through 4 and related description. Krug neither teaches nor suggests any processor that can discriminate when a detector is triggered by radiation other than radiation deriving from the illuminating beam. This reason alone serves to distinguish independent claim 1, as well as claims 3 and 4 depending therefrom, as patentable over Krug.

Moreover, to establish a prima facie of obviousness over a combination of prior art references under 35 U.S.C. 103, ALL THE CLAIM LIMITATIONS MUST BE TAUGHT OR SUGGESTED BY THE PRIOR ART. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). AAPA does not remedy the deficiency of Krug discussed above. Therefore, claim 2, dependent from claim 1, is also distinguished over Krug in combination with AAPA.

The Examiner is respectfully requested to withdraw the rejection of claim 1 over Krug.

**(6) Claims 49-51 and 58 are improperly rejected under 35 U.S.C 102(e) as being anticipated by Annis2.**

Claim 49, directed to detecting clandestine nuclear material in an object, is based, in relevant part, on “detecting emission ... emanating from the object” and

“distinguishing between detected penetrating radiation scattered by the object and detected emission due to the clandestine nuclear material,” as was discussed above in Summary of Claimed Subject Matter. Annis2 utilizes an X-ray system irradiating the object where the presence of radioactive material in the object is indicated by the *lack* of X-rays in transmission through the object. See Abstract, Fig. 2, Fig. 4 and the related description. In particular, the Annis2 system

... performs a threshold detection on the sampled values to identify any areas of unusually high absorption within the image of the object under inspection... (col. 3, ll. 50-53)

and

...[performs] identification of nuclear materials [by] noting areas of strong local attenuation in the transmission image, accompanied by no signal for the same region in the scatter image. (col. 4, ll. 55-59)

The principle of operation of the Annis2 system – detecting a *lack* of the signal associated with penetrating radiation – is incompatible with the claimed invention requiring the signal to be present and detected. Therefore, the Annis2 reference does not, and cannot, teach “distinguishing between detected penetrating radiation scattered by the object and detected emission due to the clandestine nuclear material,” as recited in claim 49.

For this reason, claim 49 and the claims dependent therefrom are neither taught nor suggested by Annis2, and are patentable over this reference.

**(7) Claims 1-13 and 22-25 are improperly rejected under 35 U.S.C 103(a) over Gozani in combination with other cited prior art.**

- A. *Gozani does not teach or suggest detection of radiation that has an origin other than the illuminating penetrating radiation.*

Gozani teaches a conventional transmission X-ray imaging system that detects radiation derived from the beams of radiation produced by a source of the system and illuminating the object:

Irradiation of the object is accomplished by producing a neutron beam and moving the interrogated object stepwise or continuously relative to the beam. The nuclear interactions of highly penetrating neutrons within the irradiated volume of the object give rise to ... characteristic gamma rays. The energy and intensity of the emitted gamma-rays provide information about ... the specific atomic nuclei within the object. From this information... the images of the... nuclei ... are inferred. [Such images] allow a decision to be made as to the presence of contraband.

Abstract. *See also* Summary of the Present Invention, col. 6, l. 65 – col. 7, l. 4.

In other words, the only detection that Gozani teaches is detection of radiation that derives from the illuminating beams. As was discussed above, all of the currently pending claims require detection of radiation derived from a source other than the illuminating beam. Moreover, claim 1 requires a processor configured as a detector signal discriminator to generate an output indicating whether the detector signal is triggered by such radiation. Therefore, insofar as Gozani does not teach or suggest detection of radiation from a source other than the illuminating beam, the corresponding elements of claims 1-13 and 22-25 are neither taught nor suggested by Gozani.

*B. Cited prior art is unsuited for combination with Gozani absent teaching of detection of radiation that has origin other than illuminating penetrating radiation.*

A prima facie case of obviousness over the combination of cited prior art references requires that ALL THE CLAIM LIMITATIONS MUST BE TAUGHT OR SUGGESTED BY THE PRIOR ART. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

As was discussed above in reference to claim 49, Annis2 does not remedy the foregoing deficiency of Gozani, namely, Annis2 does not teach

detection and discrimination of penetrating radiation other than that of the illuminating beam. Therefore, claims 1-3, 6-8, 13, and 22-24 could not have been obvious, from combination of Gozani and Annis2, to a person of ordinary skilled in the art at the time the current invention was made.

The Armistead reference teaches, in relevant part, an X-ray system employing a photoneutron probe, where the source of X-rays is converted to a source of neutrons using a Be converter to produce a beam of photoneutrons targeted on designated suspicious areas. Emission of gamma rays by radioactive material in response absorption of neutrons serves as a basis for detection of radioactive elements. Summary of Invention, col. 2 ll. 60-65, col. 3 ll. 10-25. See also “beam converter” 60 and “neutron beam on” 62 of Fig. 2 and the related discussion. All radiation detected in Armistead has its origin, therefore, in illuminating penetrating radiation, i.e. X-ray source 14 of Fig. 1, and the Armistead reference does not remedy the deficiency of Gozani. Therefore, claim 4 is allowable over Gozani, whether or not in combination with Annis2 and Armistead.

Similarly, all the detector signals taught by Czirr, Annis1, or Resnick have an origin in the illuminating penetrating radiation. Therefore, Czirr, Annis1, and Resnick taken alone or in combination do not remedy the abovediscussed deficiency of Gozani. Claims 5, 9-12, and 25 are, therefore, patentably distinguishable over the cited prior art.

Absent a teaching of the claimed feature (i.e., detection of radiation having origin other than illuminating penetrating radiation) by one or more of the cited references, alone or in combination, claim 1 and its dependent claims remain patentable over the entire suite of cited references. Reconsideration of all the obviousness rejections discussed above is respectfully requested.

### **CONCLUSION**

All pending claims, when Applicants' amendment of November 8, 2007 is entered, are believed to be in a form suitable for allowance, which the Applicants respectfully request. If it will assist further consideration of this application, the Applicants ask that the Examiner contact the undersigned, Samuel J. Petuchowski. It is believed that no extension of time is required for timely consideration of this response. In the event that an extension has been overlooked, this conditional petition of extension is hereby submitted. Applicant requests that deposit account number 19-4972 be charged for any fees that may be required for the timely consideration of this application.

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Respectfully submitted,

/ Samuel J. Petuchowski, #37,910/

Samuel J. Petuchowski, Ph.D.  
Attorney for the Applicants  
Reg. No. 37,910

Bromberg & Sunstein LLP  
125 Summer Street  
Boston, MA 02110-1618  
(617) 443-9292

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